factory tissue for lining, the cavity being free from an excess of oily secretion and hair.

A Thiersch graft is taken from the lateral aspect of the thigh. Enough skin is taken to completely cover the dental stent, raw surface outward, making sure that there is no turning in or curling of the edges. The average graft usually measures from 3½ to 4 inches in length by 3¼ inches in width. The form, with the graft covering, is gently slipped into the socket, the overlapping edges of the graft being placed forward; the lids are then closed and a pressure bandage, reinforced with adhesive tape, is applied. The dressing is changed in from five to seven days, the form being left in place for twenty-one days, when the stent is gently removed, allowing the graft to remain behind. If there has been a successful taking of the skin-graft, the result will be a permanent eye socket completely lined with epidermis, which furnishes a fair stump for an artificial eye. The artificial eye may be put in any time within two or three weeks after the removal of the stent.

At times we are called upon to correct deformities of the upper lid, either resulting from a wound or associated with ectropion. Usually, in these deformities there is an involvement of the skin, conjunctiva, muscle, and tarsus. When deformities are not too large, the punched-out or notched area can be repaired very satisfactorily by the "halving operation."

All scar tissue is excised, the tarsus is identified and cut clean, so as to give a firm approximation of the edges; equal amounts of tarsus are removed at the upper and lower margins. The skin and orbicularis are cut so as to form a flap on one side and a rectangular area of tarsus is exposed on the other side. If the eyeball has been removed, a canthotomy must be performed and a portion of the external canthal ligament severed, to release the tarsus. This done, the tongue of skin is trimmed enough for adjustment, and a small triangular piece of skin may be removed above to avoid puckering. The conjunctiva and tarsal flaps are first sutured, passing a mattress suture through the flaps and tying, after passing it through a small piece of rubber tubing. Sutures are introduced in the skin to give apposition to the skin flaps. The mattress sutures are removed on the fourth day, and the skin sutures on the sixth. The tarsal wound and skin wound should never be in the same position, but should be placed so that there is no lapping, for here lies the secret of success in this operation.

In concluding, we may briefly sum up the important points to be considered in the application of plastic surgery for the correction of the various deformities of the nose and about the orbit:

1. The surgeon should search for the underlying causes of the deformity.

2. He should be familiar with the anatomy of the part to be corrected.

3. Thorough attention should be given the importance of primary eradication of all foci of infection.

4. The constitutional condition of the patient should be thoroughly understood, and where syphilis or tuberculosis is found proper therapy instigated.

5. The avoidance of creating new disfigurements in an attempt to correct those already existing.

6. Judgment in selecting sites for securing skin grafts; the advantage of securing skin that matches the surrounding parts when possible.

7. The control of hemorrhage by pressure rather than by burying sutures.

8. The avoidance of roughly handling the tissues by either digital or careless instrumental manipulation.

9. Rigid asepsis and surgical technique.

10. Patience on the part of the operator. The surgeon should not force too much at one sitting. Nature should be given a chance. Also remember the dictums of Gillies, "Time is the greatest ally of the surgeon."

861 Sutter Street.

TYPE TREATMENT OF PULMONARY TUBERCULOSIS

By SIDNEY J. SHIPMAN, M. D., *San Francisco*
(From the Department of Medicine, University of California)

The rational treatment of pulmonary tuberculosis should be based somewhat upon the type of disease present.

Broadly speaking, there are two predominant types of pulmonary tuberculosis—the exudative and the productive.

The onset of the exudative type of pulmonary tuberculosis is usually stormy, and the intensity is determined largely by the area or areas involved.

The course of the exudative type when retrogressing is often surprisingly uneventful. The temperature may fall rapidly, soon the pulse may be normal, and the weight excellent.

The course of the productive type if retrogression occurs is, as one might expect from the pathology, marked by a slower fall in temperature and pulse, with occasional subsequent elevation.

The differential evidence furnished by the roentgenogram is of the utmost importance, provided the plates or films are technically good.

Local and general rest, taken as far as possible in the open air, with a high-caloric diet, forms the foundation of all pulmonary tuberculosis therapy.

Exercise is rest in its negative phase—it is merley the withdrawal of an equivalent amount of inactivity.

These principles in the treatment of pulmonary tuberculosis are primary; all others are secondary.

DISCUSSION *by Chesley Bush, Livermore; Lewis Sayre Mace, San Francisco; J. Tracy Melvin, Porterville; Ralph L. Byrnes, Los Angeles.*

THE rational treatment of pulmonary tuberculosis should be based somewhat upon the type of disease present. It is no longer sufficient to treat all cases of pulmonary tuberculosis merely as minimal, moderately advanced or advanced cases. The type, as well as the extent of the disease, demands consideration.

Broadly speaking, there are two predominant types of pulmonary tuberculosis—the exudative and the productive. Certainly, aside from minimal cases or frankly massive pneumonias, it is difficult to find lesions of any extent wholly exudative or wholly productive. Nevertheless, the one or the other frequently predominates and largely determines the clinical course of the disease. Let it be understood, therefore, that the terms "exudative" and "produc-

tive," as here employed, refer merely to the predominant characteristic of the individual case.

THE EXUDATIVE FORM

The exudative form begins with a coagulable exudate and an infiltrate of leucocytes and cells from the alveoli, atria, and bronchiols. The unstable nature of this material makes aspiration into new areas easy and, consequently, favors extension. Indeed, changes, either progressive or retrogressive, might be expected to take place quickly from the very nature of the process. If retrogression occurs there may be:

1. *Resolution.* This may occur before much damage has been done to neighboring tissue. The exudate may be liquified, partially expectorated, and partially borne away by the lymph stream. The result is functional restoration. This process was undoubtedly recognized by Virchow, and more recently has been demonstrated experimentally in animals by Gardner. The latter remarks: "It is not yet demonstrated that human pulmonary tuberculosis, being, as it usually is, an autogenous reinfection upon sensitized soil, most often with virulent organisms, can likewise heal by resolution. The steps in the proof of such a process are lacking, but any experienced clinician has seen the lesions of pulmonary tuberculosis disappear before his eyes, leaving no trace that he can detect by x-ray films or by physical signs." Lacking the steps in this positive proof—surely very difficult to obtain in human beings—we are yet justified on clinical and roentgenological grounds in claiming the use of the word "resolution." If the process is not, in fact, resolution, it so closely resembles this change that, for clinical purposes, we may assume the two to be identical.

2. *Partial resolution, with a change to the productive type.* Resolution may take place slowly and be incomplete. The lesion partially disappears. Some of the exudate is removed, but a proliferation of the fixed tissue or lymphatic elements begins and the focus changes character.

3. *Caseation followed by healing.* The cells lying in the alveoli nearest the center of the focus break down as a result of toxins elaborated by the tubercle bacilli, the neighboring alveolar walls are destroyed, partly by toxins, partly by pressure. The center of the focus becomes a homogeneous, caseous mass. Complete restoration of function is impossible, since actual lung tissue has been destroyed, but the caseous material may inspissate and be encapsulated in time, or finally may even calcify.

This third process is partly progressive and partly retrogressive in character. Purely progressive changes may take place as follows:

4. *Caseation followed by cavitation.* Caseation occurs as above described. Ferments liberated by the destruction of leucocytes tend to liquify the caseous material. Excavation follows, leaving a fresh, thin-walled cavity, whose extent depends upon the extent of the original caseous focus.

5. *Rapid extension, with early death.* Fresh areas are constantly involved with the production of an overwhelming toxemia, resulting in early death.

THE PRODUCTIVE FORM

The productive form is probably a reaction to a smaller number of bacilli. Thus, in the beginning, the foci are small and coalesce to form clinically recognizable tubercles. Epithelioid cells appear early and, through the coalescence of several of these, the typical Langhans type giant cells are formed. It is said that the greater the productive character of the lesion, the greater the development of the giant cells, both as to size and number of nuclei. The following changes occur:

1. *Fibrosis.* Through fibroblastic proliferation a fibrous nodule develops, with more or less hyaline change, well encapsulated.

2. *Caseation* may occur at the center of the tubercle, only to become incapsulated later.

3. *Slow extension,* with constantly occurring new areas of involvement.

4. *Ultimate massive scarring* with deformities, or firm-walled cavities.

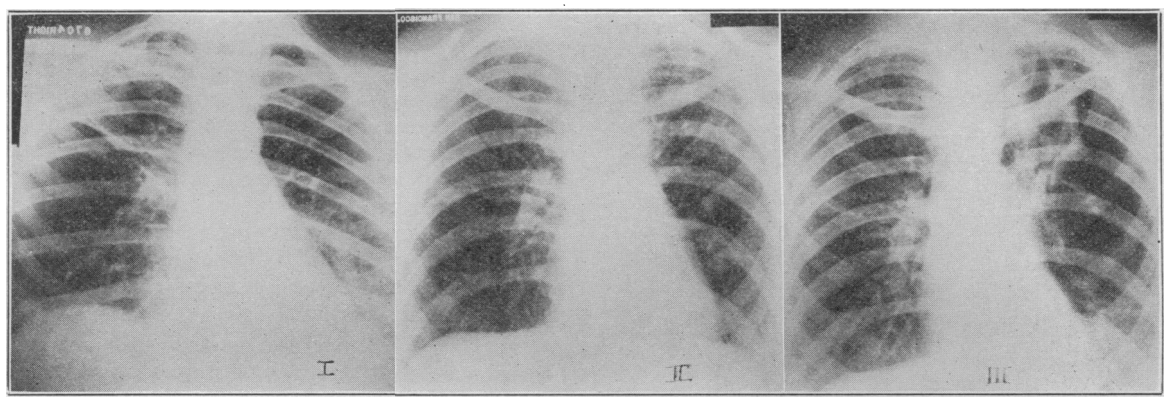
These types may often be made out quite easily in individual foci. In a lung which may contain any number of foci the problem is infinitely more complex. A lung containing typical, apparently arrested productive foci, may harbor one or more areas of tuberculous pneumonia—exudative foci. Exudative foci may gradually become fibrous. Various combinations of the above factors may produce an almost infinitely complex picture in which no predominant character remains. The amount and virulence of the infecting agent, the manner of spread, the local and general, and the inherited and acquired resistance all unite to vary the reaction. The latter remains simple, in direct proportion to the predominance of one or more of the above factors, acting over a longer or shorter period of time.

DIFFERENTIATION

The onset of the exudative type of pulmonary tuberculosis is usually stormy, and the intensity is determined largely by the area or areas involved. There is usually a well-marked p. m. temperature. The onset of the productive type, however, is more apt to be insidious and there may be little or no elevation of temperature.

The striking points of difference (points of extent, not intensity) on physical examination are the circumscribed signs in relation to the marked symptoms in the exudative form, as compared to extensive physical signs accompanied by comparatively few symptoms in the productive form. Rales are a valuable indication; when present they are very moist in the exudative type and are usually abundant over the involved area. Indeed, if physical signs are present at all in the exudative type, they are usually quite definite, intense, and sharply circumscribed.

The course of the exudative type when retrogressing is often surprisingly uneventful. The temperature may fall rapidly, soon the pulse may be normal, and the weight excellent. Cough and expectoration are in direct relation to the amount of tissue destruction. If retrogression does not occur, the course is generally as stormy as the onset. The temperature shows a well-marked p. m. rise, the pulse is



Productive type

Exudative type

Same case as shown in Plate II, six months later. Note resolution in right upper.

rapid, and the usual symptoms of pronounced toxemia are in evidence. Sudden sharp but transient elevations of temperature in a patient whose course otherwise is satisfactory usually mean slight fresh areas of invasion.

The course of the productive type if retrogression occurs is, as one might expect from the pathology, marked by a slower fall in temperature and pulse, with occasional subsequent elevations. These are usually slight and do not necessarily mean the invasion of sound tissue. Progression is evidenced by the usual symptoms of toxemia gradually increasing.

The differential evidence furnished by the roentgenogram is of the utmost importance, provided the plates or films are technically good. The early exudative lesion, involving, as it usually does, one or more lobules is somewhat larger than the early productive focus (really a collection of foci) and, because of its almost liquid or semi-solid character imperceptibly blends into the surrounding normal lung tissue or with another focus. The center of each focus is, of course, thickest and casts the heaviest shadow. Since this fades out gradually toward the periphery, a large number of such foci form a collection of soft more or less blended shadows of extremely poor definition. Massive reactions may occupy one or more entire lobes. Caseation naturally accentuates, and excavation lightens the shadows. The productive foci are more sharply defined than the exudative; they are more strikingly set off from the surrounding normal lung tissue, and though they may be of many sizes they do not blend so nicely. They are often nodular or linear.

During the progress of the case the roentgenogram manifests striking changes. In the exudative form, resolution is evident from the total disappearance of the foci. Caseation, by an accentuation of the central portion of the shadow, which may become divisible into two components, the inner caseous mass and the outer granulations. In the productive type, as retrogression occurs, there may be a general hardening of the shadows, although since the central portions may caseate or simply become firmer through fibrosis, it is impossible to differentiate the latter change through the roentgenogram.

Finally, the fact should be stressed that all available means of differentiation should be employed in classifying individual cases, and in the application of this classification to treatment.

TREATMENT

Local and general rest, taken as far as possible in the open air, with a high-caloric diet, forms the foundation of all pulmonary tuberculosis therapy. Exercise is rest in its negative phase—it is merely the withdrawal of an equivalent amount of inactivity. These principles in the treatment of pulmonary tuberculosis are primary; all others are secondary. It remains to be seen whether the differentiation of types may not be useful in the application of rest.

As generally employed, bed rest ceases a few days or a few weeks after the pulse and temperature have become normal, depending upon the extent or intensity of involvement and the clinical judgment of the physician in charge. The latter may be a radical or a conservative, although it should be said that the conservatives are generally the more successful in the handling of this disease. Nevertheless, keeping a patient in bed indefinitely because of fear of a relapse is certainly not justified.

In consideration of types and the application of treatment to them, two fundamental principles should be borne in mind: First, that resolution is favored by rest; and second, that fibrosis or scarring is facilitated by gentle movement.

The exudative type of lesion is the typical inflammatory type of reaction in the lung. More or less resolution is to be expected. Restitutio ad integram is only possible through resolution. Hence, resolution, as complete as possible, should be our aim in dealing with this type of lesion. Thus, rest should be made as absolute as practicable until that amount of resolution which will occur with any degree of rapidity has taken place. This is best learned by means of frequent rentgenograms, taken monthly if possible.

A consideration of the pathology of the disease has shown that these changes should take place quite rapidly in either direction. For this reason rest is still more essential in this type of case, since any movement favors extension of the semi-liquid alveolar contents and spread of the disease.

With the productive type the situation is somewhat different. After the symptoms of toxemia have disappeared it must be assumed the foci are

no longer throwing toxic products into the circulation. Scarring should be in progress. Nevertheless, retrogressive changes must be expected to occur slowly, and complete restitutio ad integram is known to be impossible. At this stage the benefit of motion lies in its stimulus to scarring, and the danger in the fact that it may disrupt the delicate walls of granulation tissue and thus produce new foci. Except in pneumothorax, and usually not even then, all motion is not inhibited. The normal respiratory movements never cease, and in the average case furnish the ideal stimulus to this type of lesion. Under the influence of gentle exercise, such as slow walking, the effect is enhanced and retrogressive changes further favored, provided always that no symptoms of toxemia be present.

The dangerous type of movements are those sudden distorting efforts, such as violent coughing, lifting objects, and straining at stool. Many a patient owes his unsatisfactory condition to uncontrollable coughing, which may account for repeated extensions, and even be an indication for pneumothorax.

In view of these facts, it seems highly desirable to attempt to determine the predominant characteristic in cases of pulmonary tuberculosis, if this be possible. Rest and exercise may then be used, with their effect upon the pathological condition in mind. It is true that there are many other factors involved, such as auto-tuberculinization and a host of others, but they will be found to conflict in no way with the fundamental principles involved.

It will be noted that the chief difference in treatment of the two types is one of time. Graduated exercise is employed in both—earlier in the productive than the exudative type. Moreover, it is believed that the pathological changes in the exudative type, as recognized by frequent stereoroentgenograms, should be one of the chief factors in allowing tuberculous patients exercise, or in prolonging bed rest beyond the time when a consideration of symptoms alone would suggest that it might be abandoned.

The employment of secondary measures has purposely been ignored as outside the scope of this paper. It should be mentioned in passing, however, that tuberculin (as the term is ordinarily understood) should never be used in the exudative type of pulmonary tuberculosis for reasons which should be sufficiently obvious.

Small photographs of roentgen films of the chest are generally unsatisfactory. Nevertheless, three are herewith presented, in the hope that they may illustrate to some extent the foregoing discussion. Plate 1 shows the productive type of lesion, involving chiefly the right upper and the left lower lobes. There is a good deal of pleural thickening on the right. Plate 2 shows the exudative type of lesion, involving chiefly the left upper and the right upper lobes. There are several cavities in the left upper. The apparent annular shadow in the right upper is an artifact, due to the configuration of the exudative foci. Plate 3 shows the same exudative case six months later. A partial pneumothorax has been induced on the left, in the hope of obliterating the cavities, an end which was later accomplished, in spite of the adhesions which are seen in this film. Note particularly the complete disappearance of many of the exudative foci in the right upper.

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DISCUSSION

CHESLEY BUSH, M. D. (Livermore, California)—Doctor Shipman has made a very timely exposition of the exudative and proliferative types of lung tuberculosis. As he states, the two types are usually mixed, but where one type predominates recognition of the type assists in treatment. In fact, those who have had long experience in the handling of tuberculosis have unconsciously grouped their paitents in just this way.

That tuberculosis apparently can heal by resolution is one of the outstanding facts brought to us since we have been checking our cases with continued use of roentgenograms. This has been brought to our attention rather startlingly at Arroyo. We have seen it in both adults and children. Anatomically, the resolution may not be perfect, but the clearing of lung tissue is striking. The old dictum "that a tuberculosis of the lung, once showing on an x-ray plate always shows" is no longer true. When a patient comes to us now with the history of having had, years ago, rales in a lung, and of having had at that time a diagnosis of tuberculosis, we no longer doubt the ability of the former diagnostician when a physical and x-ray examination fail to reveal anything.

We have been telling patients for years that the sickest individual often makes the quickest recovery, quicker than one with slight clinical symptoms. We have seen this happen again and again. It is the exudative case versus the proliferative case.

There is no doubt in our mind that many cases of the exudative type can be turned into cases of the proliferative type by careful treatment. This may explain the fact brought out by young Trudeau in his study of cases at Saranac Lake that many patients have an increase of rales with clinical improvement.

The time to begin exercise with any patient calls for the nicest discrimination and judgment on the part of the physician. While productive type cases may begin exercise with less danger, it is always well to emphasize the fact that the supervising medical man must be mighty sure of his classification, and then always to make the error on the safe side—that of continuing rest too long.

LEWIS SAYRE MACE, M. D. (240 Stockton Street, San Francisco)—Doctor Shipman has done well to remind us that a knowledge of prognosis is necessary before prescribing treatment. The diagnosis of tuberculosis is easy—much easier than prognosis, since for prognosis one must be able to differentiate between the many types of disease which may be present.

The individual resistance I believe to be the most important factor, though it must be remembered that the virulence of the particular strain, as well as the dosage or amount of infection, are also variables which must be considered. With three variable factors in every case of infection, it is evident that there are many different types to be considered from the standpoint of prognosis and treatment, and. that a diagnosis of tuberculosis, instead of being the end, is really the beginning of the task.

In our present state of knowledge I believe that more harm is done by failure to recognize the type of disease the patient is suffering from than from a failure to make a correct diagnosis. It is a very frequent experience to see someone with a rapidly progressing, virulent type of tuberculosis in which recovery is out of the question condemned to leave a comfortable home and the loving care of relatives, in the hope that a distant climate and strange regime will accomplish the impossible.

From an anatomical standpoint, the recognition of type is very difficult, for, as Shipman states, many kinds of pathology are present in each case.

It will be much easier, I believe, for the physician to approach the question of prognosis and treatment from the standpoint of the resistance of the patient and the virulence of the infection than to attempt to recognize various so-called stages of the disease or differences based on anatomical pathology.

J. TRACY MELVIN, M. D. (Porterville, California)—We are under obligations to Doctor Shipman for one of the

clearest and most condensed portrayals of the pathological changes which occur in a tubercular lung which has appeared for a long time. He has made very definite the picture upon which practitioners must base their diagnosis, their prognosis and, to some extent, their treatment.

He shows the problems to be very different from the conceptions of some years ago, when we only had to consider if the patient was or was not actively tubercular.

The point for reiterated emphasis is, that the clearer and more accurately we visualize the pathology of a given case, the more rational and successful our treatment may be; realizing the constantly changing and infinitely complex variations of type which each patient may manifest during the various periods of the history. Here, too, looking backward, we find reasons for many of our unexpected results from climatic treatment years ago.

Among the thousands of actively advanced tubercular patients who came out to Colorado and the Southwest some thirty or forty years ago, a very definite proportion would stage complete and permanent recovery under our advice to "get out and rough it"; and we paid but little attention to those whose downward progress must have been accelerated by this advice. We did not at that time distinguish between those types where the exudative processes were the dominant factor, for whom absolute rest might be the only possible chance for an arrest, and that other class where the proliferative changes had slowly proceeded and who were able, under the stimulation of a new and favorable environment, to stimulate this process to such an extent that a further fibrosis progressively ensued to a symptomatic recovery.

Has not the tendency recently been to place too much reliance on the postulate of continuous rest, long continued, regardless of type, when our older experience showed us clearly that there is a type and stage which needs the stimulation of definite exercise to make the best improvement possible in a given time?

RALPH L. BYRNES, M. D. (1501 South Figueroa Street, Los Angeles)—Doctor Shipman's paper differentiating the exudative and the proliferative types of tuberculosis is indeed well presented. He has by no means attempted the discussion of the blending of these types, but has stressed the differential pathology of each type of infection. The methods of treatment and the reasons for that particular treatment in each type of case are substantiated. He has spoken of the early resolution with recovery similar to a recovery from pneumonia (coccus infection). One such case came to my attention recently. This young woman (21 years of age) had a typical exudative type of tuberculosis of the right upper and upper portions of the middle lobes which cleared in less than two months' time; however, after taking a very bad cold the pathological and clinical findings were approximately those of the first examination. The lung is again clearing, as in the first instance.

As has been mentioned in the discussion, the earliest form of treatment of tuberculosis by exercise was probably, in part, founded upon the successful results of the exudative type of infection, but the earliest exponent of the exercise theory, Brehmer, considered the small heart as a predisposing factor; therefore, to obviate the cardiac handicap he prescribed graduated exercise. Rest treatment came as a gradual development, based upon observation; and, as the knowledge of tuberculosis increases and further differentiation in type is made, the individual treatment will become more specific, as Dr. Shipman has so capably pointed out.

"The skilful in medicine," wrote Dr. William Cadogan, two hundred odd years ago, "and learned in nature, know well that health is not to be established by: medicine; for its effects are but momentary, and the frequent repetition of it destructive to the strongest frames; that if it is to be restored, it must be by gently calling forth the powers of the body to act for themselves, introducing gradually a little more and more activity, chosen diet, and, above all, peace of mind, changing entirely that course of life which first brought on the disease: medicine co-operating a little."

Compare that with displayed "news" and "new discoveries" of today, and we get an interesting line on human progress.

SPEECH DEFECTS AND DISORDERS

By MABEL FARRINGTON GIFFORD, *San Francisco*

DISCUSSION

SPEECH defects and disorders up to the present time have suffered much from misunderstanding and neglect; in fact, from a misapprehension and lack of differentiation between the nervous speech disorders and the purely physiological speech disorders, much positive harm has been done.

At present there seems to be an awakening realization of this big problem, as evidenced by the fact that a number of the larger cities in the United States have inaugurated a speech correction department into their public school system. In 1916 San Francisco started its speech correction department under the guidance of Mrs. Mabel Farrington Gifford, and today its ninety-six public schools each have their daily speech drill period in segregated groups for stutterers and for articulation and foreign mispronunciation cases. A free speech clinic, too, is maintained by the University of California Medical School once a week on Saturday mornings, to which are referred any persons who come under observation in the hospital, as well as obstinate cases from the schools.

DEFINITION

Speech defects must be classified into two groups—the nervous speech disorders and the articulation defects.

Under nervous speech disorders come (1) stuttering, (2) stammering, (3) cluttering, (4) nervous hesitation. Stuttering and stammering are spasmodic actions of the speech muscles, which manifest themselves visibly or audibly in varying degrees. Stuttering, as understood in the United States, is a rapid repetition of the initial sounds of words, i. e., "K-K-K-Katie." Stammering is illustrated by the phrase, "I c——an." For the sake of simplicity, and because in Europe stammering is differently defined (namely, as an articulation defect) we shall use the term *stuttering* only to represent either form, as illustrated. Cluttering is the slurring over or omission of certain parts of words as the result of rapid, choppy utterance. Nervous hesitation is agitated, faltering speech.

Under articulation defects we have lisping, substitutions of sounds, infantile speech, the unformed speech resulting from cleft-palate defects, and foreign mispronunciation. These articulation defects may be traced to hare-lip, feeble or very short upper lip, overshot jaw, narrow palate, sluggish palate, cleft palate in varying degrees, nasal obstructions, tongue-tie, or very irregular teeth. Lisping of the sounds s-z-sh-zh-ch-j is caused by a protrusion of the tongue and substitution of the *th* sound. Substitution of sounds is illustrated by the saying of *tan* for *can* or *Sharlie* for *Charlie*. Infantile speech is baby-talk which the child has never outgrown. Cleft palate has, of course, a mechanical cause, and is the result of sound rushing from the nose. Foreign mispronunciation is mainly due to the fact that foreign national speech habits are different from our own, and each nationality has its own difficulties to overcome in the learning of English. The Spanish, for